Amendments to the Specification

On page 6, please replace paragraph 25 with the following amended paragraph:

The present invention relates to fluxon injection systems. Further, the fluxon injection systems according to some embodiments of the present invention are demonstrated both experimentally and numerically. Experimental demonstrations of the fluxon injection systems according to some embodiments of the present invention show injection and removal of a desired number of fluxons into or out of an annular Josephson junction. Further, a theoretical model of the fluxon injection systems is described. Numerical simulations based on the proposed model describing the fluxon injection systems show good agreement with the experimental data and provide further ~~incite~~ insight into the fluxon injection process and fluxon interaction with small pinning potential remaining in the injection region. Several embodiments of the fluxon injection systems according to the present invention are described.

On page 19, please replace the abstract with the following amended abstract:

An A ~~method and~~ apparatus for inserting fluxons into an annular Josephson junction is disclosed. Fluxon injection according to the present invention is based on local current injection into one of the superconducting electrodes of the junction. By choosing an appropriate value for the injection current, which depends upon the spacing between injecting leads among other factors, the residual fluxon pinning can be reduced to a very small level. Fluxon injection according to the present invention provides for fully controlling the trapping of individual fluxons in annular Josephson junctions and is reversible to a state of zero fluxons without heating the Josephson above its critical temperature. Fluxon injection according to the present invention can be used for preparing the working state of fluxon oscillators, clock references, radiation detectors and shaped junctions that may be used as qubits for quantum computing.